

CORRECTED VERSION

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
22 January 2004 (22.01.2004)

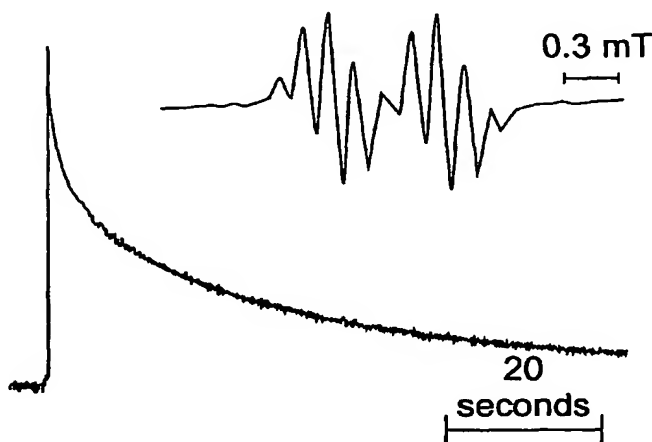
PCT

(10) International Publication Number  
**WO 2004/007475 A1**

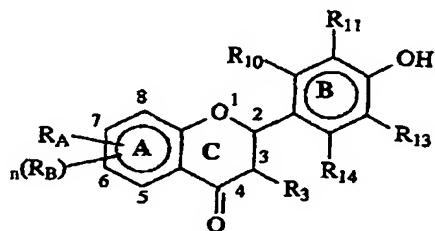
- (51) International Patent Classification<sup>7</sup>: C07D 311/30, 311/32, A61K 31/35, A61P 39/00
- (21) International Application Number: PCT/GB2003/003054
- (22) International Filing Date: 14 July 2003 (14.07.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 0216371.5 13 July 2002 (13.07.2002) GB
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- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,

[Continued on next page]

(54) Title: FLAVONOID COMPOUNDS AS THERAPEUTIC ANTIOXIDANTS



(57) Abstract: Novel flavonoid compounds having anti-oxidant activity are described. Formula (1). The compounds have been shown to exhibit anti-oxidative properties in biological systems and their utility in a sunscreen or skincare composition or to treat conditions involving oxidative damage, especially curative or prophylactic treatment of Alzheimer's disease or ischaemia-reperfusion and injury, is described.



(1)



GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

**Published:**

— with international search report

**(48) Date of publication of this corrected version:**

18 March 2004

- (84) Designated States (regional):** ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

**(15) Information about Correction:**

see PCT Gazette No. 12/2004 of 18 March 2004, Section II

*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

## INTERNATIONAL SEARCH REPORT

PCT/GB 03/03054

<b>A. CLASSIFICATION OF SUBJECT MATTER</b> IPC 7 C07D311/30 C07D311/32 A61K31/35 A61P39/00		
According to International Patent Classification (IPC) or to both national classification and IPC		
<b>B. FIELDS SEARCHED</b> Minimum documentation searched (classification system followed by classification symbols) IPC 7 C07D A61K		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the International search (name of data base and, where practical, search terms used) EPO-Internal, WPI Data, PAJ, CHEM ABS Data		
<b>C. DOCUMENTS CONSIDERED TO BE RELEVANT</b>		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE MEYER ET AL: "4'-Hydroxy-3-methoxyflavones with potent antipicornavirus activity" JOURNAL OF MEDICINAL CHEMISTRY, AMERICAN CHEMICAL SOCIETY, US, vol. 34, 1991, pages 736-746, XP002101672 ISSN: 0022-2623 Cpds. 4,5 page 739; table I  ----- -/--	1,6,8
<input checked="" type="checkbox"/> Further documents are listed in the continuation of box C. <input checked="" type="checkbox"/> Patent family members are listed in annex.		
<b>* Special categories of cited documents :</b>  *A* document defining the general state of the art which is not considered to be of particular relevance *E* earlier document but published on or after the international filing date *L* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) *O* document referring to an oral disclosure, use, exhibition or other means *P* document published prior to the international filing date but later than the priority date claimed  *T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention *X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone *Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. *8* document member of the same patent family		
Date of the actual completion of the international search  6 November 2003		Date of mailing of the international search report  04/12/2003
Name and mailing address of the ISA European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016		Authorized officer  Fritz, M

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PCT/GB 03/03054

C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	MIRANDA C L ET AL: "ANTIOXIDANT AND PROOXIDANT ACTIONS OF PRENYLATED AND NONPRENYLATED CHALCONES AND FLAVANONES IN VITRO" JOURNAL OF AGRICULTURAL AND FOOD CHEMISTRY, AMERICAN CHEMICAL SOCIETY. WASHINGTON, US, vol. 48, no. 9, September 2000 (2000-09), pages 3876-3884, XP001149407 ISSN: 0021-8561 cf. cpds. IX, 6PN, 8PN, DPN, 6GN, 8GN on p. 3878 the whole document ---	1-45
Y	SUTTHIVAIYAKIT S ET AL: "Diterpenylated and prenylated flavonoids from Macaranga denticulata" TETRAHEDRON, ELSEVIER SCIENCE PUBLISHERS, AMSTERDAM, NL, vol. 58, no. 18, 29 April 2002 (2002-04-29), pages 3619-3622, XP004350379 ISSN: 0040-4020 Cpds. 1,4 on p. 3619 the whole document ---	1-45
Y	US 5 280 024 A (ROLLAND YVES ET AL) 18 January 1994 (1994-01-18) the whole document -----	1-45

## INTERNATIONAL SEARCH REPORT

PCT/GB 03/03054

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 5280024	A	18-01-1994	FR 2689127 A1	01-10-1993
			AT 153022 T	15-05-1997
			AU 3559193 A	07-10-1993
			CA 2092961 A1	01-10-1993
			DE 69310602 D1	19-06-1997
			DE 69310602 T2	18-12-1997
			DK 564350 T3	15-12-1997
			EP 0564350 A1	06-10-1993
			ES 2104090 T3	01-10-1997
			GR 3023938 T3	30-09-1997
			JP 2082884 C	23-08-1996
			JP 6025212 A	01-02-1994
			JP 7119221 B	20-12-1995
			NZ 247287 A	26-08-1994
			US 5457103 A	10-10-1995
			ZA 9302312 A	18-10-1993